



china eu india japan korea russia usa



### **ITER Barcelona: a unique opportunity for our enterprises**

On June 8<sup>th</sup>, 2009 was held at the Agency Fusion for Energy in Barcelona (<http://fusionforenergy.europa.eu/>), a meeting with representatives at three different levels of the ITER project, a project focused on the developing of the technology for the production of energy from nuclear fusion. After the speech of Helena Guardans Cambó, vice-president of the Fundació Catalunya Europa, institution hosting the conference, there were the following interventions:

- Mr. Didier Gambier, Director of Fusion for Energy.
- Mr. Carlos Alejandre Losilla, chief of security for the EU's ITER project in Cadarache.
- Mr. Octavio Quintana Trias, Director of Euratom, European Commission.

Helena Guardans Cambó made the opening, framing the event in the programme of Good Practices on Energy and Environment of the Fundació Catalunya Europa. She said it was important to investigate on efficient and clean energies, two dimensions on which the ITER project focuses.

Mr. Didier Gambier began his intervention drawing a more general perspective on the evolution of research in nuclear fusion that began 50 years ago. He mentioned that, despite the apparent slowness of the progresses made, research is reaching a new stage and working with higher speed, mainly because society is starting to see the need to debate about nuclear power, and mainly in relation to nuclear fusion rather than nuclear fission.

In this sense the ITER project is gaining importance and represents the icon of the research in fusion energy. The project has developed a cooperative research system at the global level, involving countries and regions like China, USA, Russia, Europe, Japan, India and South Korea. Product of the Cold War, the ITER project goes back to the Geneva Summit in 1985 in which the presidents Gorbachov, Reagan and Mitterrand sign a joint pilot project agreement known as ITER (International Tokamak Experimental Reactor, or 'the way' in Latin). Since then, the principle goal has been working at the engineering design and construction of prototypes to demonstrate the

technical viability of the most complex components and just right now it is beginning the construction of the plant to host the Tokamak reactor. Didier Gambier also honoured the figure of Donato Palumbo, who worked tirelessly for the realization of the project, even in the worst circumstances.

After Mr. Gambier spoke Mr. Carlos Alejaldre, who began his speech presenting the world's energy demand growth, headed by developing countries like China and pointing out the existence of other countries with a low human development index, both cases in the need for an increase in the energy expenditure (the average in developed countries is 4000 watts per person). This suggests that the energy consumption, while will not be exponentially multiplied, it will grow at a sustained rate. And this can not be supplied with combustible resources, though this source of energy represents now the 80%, so it is necessary and urgent to look for alternatives. We must keep in mind: a) the availability of resources, b) the environmental impact, and c) the security of supply. Renewable energies, even though they are essential and necessary, are also limited because can be insufficient when there is a high demand pick in a specific moment. In the case of nuclear fission, there are important problems related to the waste and safety. It seems that the only alternative with sufficient potential to meet demand and environmental requirements is nuclear fusion, despite the fact that its development and possibility to commercial exploitation is in a very preliminary stage.

It is not easy to demonstrate all the advantages of generating electricity through this way, or to solve all the technical challenges that involve the construction of a specific engine that needs to force the fusion of particles at 100 million degrees of temperature in a field of magnetic confinement. The experience of the JET ([www.jet.efda.org/pages/jet.html](http://www.jet.efda.org/pages/jet.html)) in the United Kingdom, demonstrates the viability of the project, but this engine can only generate energy discontinuously, what should be solved by the ITER reactor. This reactor is being built in a decentralized way; each partner develops different components of the reactor using its own technology and then all the pieces are joined to make up the puzzle. This approach and form of functioning is not probably the most efficient, as admitted Alejaldre, but fosters solidarity among partners and the sharing of knowledge and intellectual property of the research that is being generated. The final goal, however, is at least at medium or long term, as the building of the reactor will take 10 years and the exploitation will not start until 2018.

In the third place, Mr. Gambier talked again, focusing this time in the processes and technical mechanisms to develop and build the Tokamak reactor. He said that this is a race against time, mostly because of the complexity of coordinating many actors and partners. In this sense, work need to be based on full confidence that the partners will meet their targets and be on time. At the same time, Mr. Gambier explained the activities and jobs of Fusion for Energy, European agency for the ITER project, placed in Barcelona: a) the strategic coordination of the overall project, identifying market opportunities and contracts with various parties, which requires flexible negotiations

and quick answers to technological changes and challenges, and b) the research on risk analysis and the development of technical components; in this sense they are working in the test reactions, plasma diagnostics and creation, Waste Management, design of different components such as the superconducting coil (central solenoid and toroidal field coils), vacuum chamber and internal components (sector of the camera module of the blanket, and divertor module), and robotic systems (for handling blanket modules and divertor).

Finally, was the turn of Mr. Octavio Quintana, director of Euratom, who explained that the energy demand challenge is the prerequisite for solving any other problem worldwide. He also said that the nuclear fusion energy is a necessary part of any possible combination of energy production. Europe has been ahead in fusion research for 50 years, as evidenced by the JET project, while keeping also a 45% of the ITER project. That means that besides its responsibility, Europe can not control the totality of the project costs (as it can not know what it costs to other partners to build their components), which gives a false impression of lack of transparency. At the same time, the cost that Europe can manage has risen almost twice, from 3.000 million Euros to 6.500 million. There is then a financial problem that must be resolved through negotiation with the 27 EU countries, which is not that easy. There is an agreement on the design of the engine and the calendar of the project, but there is still work to do regarding the funding and its sources.

Quintana explained that the nuclear research program of the Euratom focuses on the study of the effects on human health, although they are marginal and almost non-existent, but necessary to carry on to demonstrate and reverse civil society distrust with all issues related to nuclear power (despite the problems of fusion and nuclear fission are radically different). In this sense, the opposition of public opinion and also of some EU countries to any economic investment in nuclear research is only understood either by ethical positions, with which one cannot reason, or by economic and energy market interests, with which there is the possibility to negotiated. In sum, negotiation and to reach to consensus agreements at the European level is not an easy thing.

Quintana also remarked that above all differences, ITER project is the only one that is cohesive and unified in the EU framework, while also incorporates international partners that would seem impossible to gather in other fields. Euratom coordinates different actors and agencies of the ITER project like laboratories and research institutions through the EFDA (European Fusion Development Agreement). Some of the instruments for that coordination and the development of different tasks are specific contracts, sharing costs, training and patterns of mobility agreements, etc.

Europe is and should remain as the leader in fusion energy, both in research and in industrial specificity, the *know how*. In this sense we are experiencing a change of the economic model, and even in moments of crisis, we still need to be invested in

research and innovation, despite the uncertainty and long-term results. ITER is a good way to investment in high technology, even leaving apart the clean energy that can be generated from it in the future. It's also an opportunity for business and the Catalan industry, mostly because we have one of the main agencies placed in Barcelona. In this sense, they may have more accessibility and willingness to attend the call for tenders.

Finally, Ramon Garriga, coordinator of the Good Practice Programme on Energy and Environment, moderated the following debate and made some general conclusions about the fusion power and the need to combine this source of energy into a mixed model of energy production.